IN THE CLAIMS

1. (Currently Amended) A method for synchronizing a master clock to a slave clock located in master and slave devices communicating with one another via a laser signal beam and a communication channel, each of the master and slave devices including a homodyne detector for determining a respective correlation pattern with respect to a phase tuned local oscillator, comprising:

recording master and slave correlation patterns while the laser signal beam cycles between first and second operating modes;

transmitting the master correlation pattern and associated first and second times time at which the laser signal beam shifted between the first and second operating modes and second time at which the laser signal beam shifted between the second and first operating modes over the communications channel;

comparing a portion of the master correlation pattern between the first and second times to the slave correlation pattern to thereby determine the time offset between the first and slave correlation patterns;

and applying the time offset to the slave clock.

2. (Currently Amended) The method as recited in claim 1, further comprising generating the master correlation pattern in response to a master local oscillator beam and a time-delayed version of the laser signal beam.

3. (Currently Amended) The method as recited in claim 2, wherein the time delay associated with the time-delayed version of the laser signal beam corresponds to a the laser signal beam transit time between the-master and slave devices.

4. (Currently Amended) The method as recited in claim 1, wherein the first and second operating modes of the laser signal beam have different polarization states.

5. (Currently Amended) A method for synchronizing a master clock to a slave clock located in master and slave devices communicating with one another via a laser signal beam and a communication channel, each of the devices including a homodyne detector for determining a respective correlation pattern with respect to a phase tuned local oscillator, comprising:

recording master and slave correlation patterns while the laser signal beam cycles between first and second operating modes;

transmitting the master correlation pattern and associated first ~~and second times~~ time at which the laser signal beam shifted between the first and second operating modes and second time at which the laser signal beam shifted between the second and first operating modes over the communications channel;

calculating a time variance between a portion of the master correlation pattern between the first and second times to the slave correlation pattern to thereby determine the time offset between the master and slave correlation patterns; and

applying the time offset to the slave clock.

6. (Currently Amended) The method as recited in claim 5, further comprising generating the master correlation pattern in response to a master local oscillator beam and a time-delayed version of the laser signal beam.

7. (Currently Amended) The method as recited in claim 6, wherein the time delay associated with the time-delayed version of the laser signal beam corresponds to ~~a~~ the laser signal beam transit time between the master and slave devices.

8. (Original) The method as recited in claim 5, wherein the variance between the master and slave correlation patterns is determined in accordance with the expression:

$$V = <[(\hat{I}/\lambda)-(g/\mu)\hat{J}]^2>$$

where:

V is the variance

μ is the phase offset associated with a master homodyne detector generating the master correlation pattern corresponding to $\hat{J}$,

$\hat{J}$ is the idler homodyne current signal received by the master device,

λ is the phase offset associated with a slave homodyne detector generating the slave correlation pattern corresponding to $\hat{I}$,

$\hat{I}$ is the signal homodyne current signal received by the slave device; and

g is a scaling factor.

9. (Original) A clock synchronization system permitting synchronization of a slave clock to a master clock located in slave and master devices, respectively, communicating with one another via two separate communication channels, comprising:

means for generating a laser beam signal disposed in the master device, wherein the signal beam has first and second operating modes;

means for applying the signal beam to the slave device over a master communications channel;

a master homodyne detector disposed in the master device receiving a master phase shifted local oscillator beam;

a slave homodyne detector disposed in the slave device receiving a second phase shifted local oscillator beam;

means for recording master and slave correlation patterns generated by the master and slave homodyne detectors while the signal beam cycles between first and second operating modes;

means for transmitting the master correlation pattern and associated first and second times at which the signal beam shifted between the first and second operating modes and between the second and first operating modes over the second communications channel;

means for calculating a time variance between a portion of the master correlation pattern between the first and second times to the slave correlation pattern to thereby determine the time offset between the master and slave correlation patterns; and

means for applying the time offset to the slave clock.

10. (Original) The clock synchronization system as recited in claim 9, wherein the master homodyne detector generates the master correlation pattern in response to the master phase shifted local oscillator beam and a time-delayed version of the signal beam.

11. (Original) The clock synchronization system as recited in claim 10, wherein the time delay associated with the time-delayed version of the signal beam corresponds to a signal beam transit time between the-master and slave devices.

12. (Currently Amended) The clock synchronization system as ~~method of~~ recited in claim 9, wherein the first and second operating modes have

different polarization states.

13. (Currently Amended) The clock synchronization system as ~~method of~~ recited in claim 9, wherein the variance between the master and slave correlation patterns is determined in accordance with the expression:

$$V=<[(\hat{I}/\lambda)-(g/\mu)\hat{J}]^2>$$

where:

V is the variance

μ is the phase offset associated with a master homodyne detector generating the master correlation pattern corresponding to $\hat{J}$,

$\hat{J}$ is the idler homodyne current signal received by the master device,

λ is the phase offset associated with a slave homodyne detector generating the slave correlation pattern corresponding to $\hat{I}$,

$\hat{I}$ is the signal homodyne current signal received by the slave device; and

g is a scaling factor.

14. (Cancelled)

15. (New) A clock synchronization system to synchronize clocks comprising:

a first communications channel;

a second communications channel;

a master device comprising:

     a laser to generated a signal beam having first and second operating modes;

     an output to transmit the signal beam on the first communications channel;

     a master homodyne detector to generate a master correlation pattern based on the signal beam while the signal beam cycles between first and second operating modes;

     a storage device to store the master correlation pattern beginning at a first time at which the signal beam shifted between the first and second operating modes and ending at a second time at which the signal beam shifted between the second and first operating;

     a transmitter to transmit the stored master correlation pattern and associated first and second times on the second communication channel; and

a slave device comprising;

     a receiver to receive the signal beam from the first communications channel;

     a slave homodyne detector to generate a slave correlation pattern based on the received signal beam while the received signal beam cycles between first and second operating modes;

     a storage device to store the slave correlation pattern;

     a receiver to receive the transmitted master correlation pattern and associated first and second times from the second communication channel; and

     a processor to determine a time variance between a portion of the received master correlation pattern between the first and second times to the stored slave correlation pattern, to determine the time offset between the master and slave correlation patterns based on the determined time variance, and to apply the time offset to the slave clock.

16. (New) The clock synchronization system of in claim 15, wherein the master homodyne detector generates the master correlation pattern in response to a master phase shifted local oscillator beam and a time-delayed version of the signal beam.

17. (New) The clock synchronization system of in claim 16, wherein the time delay associated with the time-delayed version of the signal beam corresponds to the signal beam transit time between the-master and slave devices.

18. (New) The clock synchronization system of in claim 15, wherein the first and second operating modes have

different polarization states.

19. (New) The clock synchronization system of in claim 15, wherein processor determines the variance between the master and slave correlation patterns in accordance with the expression:

$$V=<[(\hat{I}/\lambda)-(g/\mu)\hat{J}]^2>$$

where:

V is the variance:

μ is the phase offset associated with a master homodyne detector generating the master correlation pattern corresponding to $\hat{J}$;

$\hat{J}$ is the idler homodyne current signal received by the master device;

λ is the phase offset associated with a slave homodyne detector generating the slave correlation pattern corresponding to $\hat{I}$;

$\hat{I}$ is the signal homodyne current signal received by the slave device; and

g is a scaling factor.

20. (New) The clock synchronization system of claim 15 wherein the laser beam signal is squeezed in the second operating mode.

21. (New) The method of claim 1 wherein the laser beam signal is squeezed in the second operating mode.

22. (New) The method of claim 5 wherein the laser beam signal is squeezed in the second operating mode.

23. (New) The system of claim 9 wherein the laser beam signal is squeezed in the second operating mode.